

CLAIMS:

1. An electronic display label system suitable for displaying information, said system comprising:
 - 5 an electronic label including a pixel-addressable display assembly comprising electronic ink disposed on a support and a first antenna for sending or receiving signals corresponding to information to be displayed by said display assembly; and
 - a remote activator module in electronic communication with the electronic label for activating the electronic label to display said information, comprising a transceiver
 - 10 for receiving input signals and sending output signals to the electronic label.
2. The label system of claim 1, wherein the activator module further includes a processor for determining said information to be displayed by said display assembly and for generating output signals for instructing the display assembly to display said
- 15 information.
3. The label of claim 2, wherein the activator module further includes a storage element for storing instructions to be executed by the processor regarding said information to be displayed.
- 20 4. The label system of claim 1, wherein the activator module is in communication with a processor for determining said information to be displayed by said display assembly and for generating the output signals instructing the display assembly to display the information.
- 25 5. The label system of claim 4, wherein the activator module is wirelessly connected to the processor.
6. The label system of claim 1, wherein the activator module output signal is a
- 30 radio wave signal.
7. The label system of claim 1, wherein the activator module provides inductive power to the electronic label.
- 35 8. The label system of claim 1, wherein the activator module provides power to the electronic label through capacitive coupling.

9. The label system of claim 1, wherein the activator module comprises a hand-held device.
10. The electronic label of claim 1, wherein:
5 the electronic label is flexible and resilient;
said electronic ink comprises a bi-stable, non-volatile imaging material; and
said electronic label operates without an on-board power source.
11. The electronic label of claim 1, wherein the electronic label is battery-free.
- 10 12. The electronic label of claim 1, wherein the electronic ink comprises a bi-stable, non-volatile imaging material.
13. The electronic label of claim 12, wherein the electronic ink comprises a gyricon
15 material.
14. The electronic label of claim 12, wherein the electronic ink comprises a cholesteric material.
- 20 15. The electronic label of claim 12, wherein the electronic ink comprises a zenithal bistable device material.
16. The electronic label of claim 12, wherein the electronic ink comprises a thermo-chromic material.
- 25 17. The electronic label of claim 12, wherein the electronic ink comprises surface stabilized, ferroelectric liquid crystals.
18. The electronic label of claim 1, wherein the electronic label is flexible and
30 resilient.
19. The electronic label of claim 18, wherein the electronic label has a thickness range between about 100 microns and about 2000 microns.
- 35 20. The electronic label of claim 1, wherein the electronic label has a thickness range between about 100 microns and about 2000 microns.

21. The electronic label of claim 1, wherein said display assembly is adapted to continue to display indicia independent of power continuing to be supplied to said label.
22. The electronic label of claim 1, wherein the antenna comprises a power antenna
5 for receiving a power signal from the activator module, and for generating an output power signal for powering the electronic label.
23. The electronic label system of claim 1, wherein the electronic ink comprises charged particles in a liquid dispersion medium encapsulated in a plurality of
10 microcapsules.
24. The label of claim 23, wherein the microcapsules are disposed between a first electrode and a second electrode.
- 15 25. The label of claim 24, wherein an image is formed in the display assembly by applying a controlled electric field to the electronic ink.
26. The label of claim 25, wherein the diameter of the microcapsules is between about 5 microns and about 200 microns and the diameter of the charged particles is
20 between about .001 and about .2 of the diameter of the microcapsules.
27. The label of claim 1, wherein the display assembly includes a first region of electronic ink for displaying a first color and a second region of electronic ink for displaying a second color.
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28. An electronic labeling system for displaying information related to items on a shelf, comprising:
a flexible antenna strip connected to the shelf;
one or more electronic labels coupled to the antenna strip, each of said electronic
30 labels comprising a pixel-addressable display layer including electronic ink disposed on a support, wherein the antenna strip communicates with said one or more electronic labels regarding the information to be displayed by the display layer; and
a transceiver coupled to the antenna strip for receiving and sending signals to the antenna strip regarding the information to be displayed by the label.
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29. The electronic labeling system of claim 28, further comprising a control system in communication with the transceiver comprising a processor and a storage element for determining the information to be displayed by the label.

5 30. The electronic labeling system of claim 29, wherein the control system and the transceiver communicate via radio wave transmission.

31. The electronic labeling system of claim 28 wherein the antenna is inductively coupled to the label.

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32. The electronic labeling system of claim 28, wherein the antenna is capacitively coupled to the label.

15 33. The electronic labeling system of claim 28, further comprising a plurality of flexible antenna strips connected to the transceiver, wherein each of said flexible antenna strips is coupled to at least one electronic label.

34. An electronic shelf label for displaying information related to an item on a shelf, comprising:
20 a display assembly including electronic ink disposed on a support,
one or more antennas for sending or receiving signals corresponding to one of instructions, programs, data or selected indicia to be displayed by said display assembly,
a storage element in circuit with said one or more antenna for storing said instructions, programs, data and indicia,
25 one or more processors in circuit with said display assembly, said storage element and said antenna for intelligently determining said indicia to be displayed by said display assembly, for controlling and coordinating operation of the label, and for generating output signals for instructing the display assembly to display the indicia, wherein the label is coupled to the shelf, and
30 a securing mechanism for coupling the label to the shelf.

35. The label of claim 34, wherein the label is mounted on the front of the shelf.

36. The label of claim 35, wherein the shelf has a molding and the label is mounted
35 in the molding.

37. The label of claim 35, wherein the label has a shape that matches the shape of the front of the shelf.
38. The label of claim 35, wherein the label has a convex shape.
- 5 39. The label of claim 35, wherein the label has a concave shape.
40. An electronic label for displaying information, comprising :
a display assembly including electronic ink disposed on a support, and
10 a thin film battery coupled to the display assembly for providing power to the display assembly.
41. The label of claim 40, wherein the battery is rechargeable.
- 15 42. The label of claim 41, wherein the label has a transceiver for sending and receiving signals regarding the information displayed by the label and the battery is rechargeable by the transceiver.
43. The label of claim 41, wherein the battery is rechargeable via ambient power in
20 the environment.
44. The label of claim 40, further comprising an antenna for sending or receiving signals corresponding to one of instructions, programs, data or selected indicia to be displayed by said display assembly.
- 25 45. The label of claim 44, wherein the label sends and receives signals between a processor via a wireless local area network.
46. An electronic labeling system for displaying information, comprising:
30 a stacked electronic label including a pixel-addressable display assembly comprising a layer of electronic ink disposed over a first electrode; and
an activator module comprising a second electrode having a polarity opposite the first electrode for controlling pixels in the display layer.
- 35 47. The labeling system of claim 46, further comprising a protective layer covering layer of electronic ink.

48. A stacked, layered electronic label suitable for displaying information, said label comprising:

one or more display layers including electronic ink disposed on a support,
a flexible integrated circuit layer electrically connected to the display layer;
5 a radio-frequency identification (RFID) layer electrically coupled to the
integrated circuit layer including an antenna and a transceiver for receiving and
generating output signals instructing the display layer to display the information,
wherein said display layer, said integrated circuit layer and the RFID layer are
stacked together to form said stacked electronic label.

10 49. The label of claim 46, wherein the RFID layer communicates with a central
controller regarding the information to be displayed by the label.

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